THE CLAIMS

What is claimed is:

1. A method of forming a structure that includes a relaxed or pseudo-relaxed layer on a substrate comprising:

growing an elastically stressed layer of semiconductor material on a donor substrate;

forming a glassy layer of a viscous material on the stressed layer;

removing a portion of the donor substrate to form a structure that includes the glassy layer, the stressed layer and a surface layer; and

heat treating the structure at a temperature of at least a viscosity temperature of the glassy layer to relax the stressed layer.

2. The method of claim 1 wherein the glassy layer is also formed on a receiving substrate and the structure includes the receiving substrate bonded to the glassy layer.

3. The method of claim 3 wherein the glassy layer is formed on the receiving substrate prior to bonding with the stressed layer.

4. The method of claim 1 further comprising using a controlled treatment that includes a second viscosity temperature to transform at least a portion of the surface layer into a second glassy layer.

5. The method of claim 4 wherein heat treating occurs during or after the formation of the second glassy layer.

6. The method of claim 4 which further comprises removing the second glassy layer.

7. The method of claim 1 which further comprises inducing crystal growth on the structure using a semiconductor material.

8. The method of claim 1 wherein the glassy layer is formed on the receiving substrate, and wherein, before bonding, a thin layer is formed on the stressed layer having a thickness that is less than that of the stressed layer.

9. The method of claim 1 wherein the glassy layer comprises a semiconductor material layer that is grown on the stressed layer and which further comprises completing a controlled treatment that transforms at least a portion of the semiconductor material layer into a viscous material at a viscosity temperature.

10. The method of claim 3 which further comprises forming a bonding layer on the receiving substrate prior to forming the glassy layer thereon.

11. The method of claim 10 wherein the bonding layer is an SiO_2 material.

12. The method of claim 1 which further comprises forming a weakened zone in the donor substrate for removal by detachment wherein the weakened zone is formed at a depth value that is close to the thickness of the surface layer.

13. The method of claim 12 wherein the weakened zone is formed by implanting atomic species into the donor substrate before the bonding step.

14. The method of claim 1 wherein the donor substrate is formed by forming a porous layer on a crystalline backing substrate, and growing a crystal layer on the porous layer, wherein the porous layer forms a weakened area in the donor substrate.

15. The method of claim 1 wherein the removing step comprises selective chemical etching.

16. The method of claim 1 wherein the glassy layer comprises an electrically insulating material.

17. The method of claim 18 wherein the glassy layer is SiO_2.

18. The method of claim1 wherein the donor substrate is Si, and the stressed layer is $Si_{1-x}Ge_x$.

19. The method of claim 1 wherein the glassy layer is a material layer grown on the stressed layer, and which further comprises completing a controlled thermal oxidization treatment for transforming at least a portion of the Si material layer into SiO_2 to form a SiO_2 glassy layer.

20. The method of claim 4 wherein forming the second glassy layer comprises using a controlled thermal oxidization treatment for transforming at least a portion of Si in the surface layer into SiO_2 to form a second SiO_2 glassy layer.

21. The method of claim 20 which further comprises, after the heat treating step, using a chemical treatment based on hydrofluoric acid to remove the second glassy layer.

22. The method of claim 6 which further comprises growing a crystal layer on the structure using a Si material.

23. The method of claim 1 wherein the glassy layer is electrically insulating and the structure is a semiconductor-on-insulator structure.

24. The method of claim 1 further comprising preparing components from at least one of the stressed layer or an epitaxial layer.

25. A structure comprising:

a receiving substrate having a top surface;

a glassy layer on the top surface of the receiving substrate; and

a relaxed $Si_{1-x}Ge_x$ layer on the glassy layer.

26. The structure of claim 25 which further comprises another glassy layer on the relaxed $Si_{1-x}Ge_x$ layer.